We claim:

1. A method of separating an olefin from a gas stream, said gas stream comprising the olefin and at least one other component, said method comprising
   (i) compressing and cooling the gas stream;
   (ii) separating the olefin from the gas stream by absorbing the olefin in an absorbent;
   (iii) separating the olefin from the absorbent by desorption;

   wherein compressing or cooling or compressing and cooling in (i) is carried out at least twice.

2. The method as claimed in claim 1, wherein compressing and cooling in (i) is carried out three times.

3. The method as claimed in claim 1, wherein, in (i), the gas stream is compressed to a pressure of from 10 to 20 bar and cooled to a temperature of from 25 to 50 °C.

4. The method as claimed in claim 1, wherein, in (i), from 30 to 90 percent of the olefin comprised in the gas stream are condensed.

5. The method as claimed in claim 1, the gas stream additionally comprising methanol or water or methanol and water.

6. The method as claimed in claim 5, wherein, in (i), from 30 to 90 percent by weight of the olefin, from 40 to 99 percent by weight of the methanol and/or from 35 to 99 percent by weight of the water, comprised in the gas stream, are condensed.

7. The method as claimed in claim 1, wherein absorbing the olefin in an absorbent is carried out in at least one absorption column at a pressure of from more than 10 to 20 bar.

8. The method as claimed in claim 1, wherein the absorbent has a boiling point of from 200 to 300 °C at standard pressure.

9. The method as claimed in claim 1, wherein the absorbent is a mixture of hydrocarbons C_nH_{2n+2} wherein n is from 10 to 20, said mixture comprising the hydrocarbon $C_{14}H_{30}$ in an amount of 10 percent by weight or more of the mixture.

10. The method as claimed in claim 1, wherein separating the olefin from the absorbent is carried in at least one separation column.

11. The method as claimed in claim 10, wherein, after separation of the olefin in (iii), the absorbent is recirculated into (ii).

12. The method as claimed in claim 10, wherein, after separation of the olefin, the absorbent is purified in a flash drum or in a forced circulation vaporizer and subsequently recirculated into (ii).

13. The method as claimed in claim 1, wherein the olefin is propene.

14. The method as claimed in claim 1, wherein the gas stream is an offgas stream resulting from an epoxidation process, said process comprising reacting the olefin with a hydroperoxide to give a product stream comprising olefin and olefin oxide and at least one other component, and separating the olefin oxide from said product stream to give the offgas stream.

15. The method as claimed in claim 14, wherein the epoxidation reaction is carried out in the presence of a solvent comprising methanol.

16. The method as claimed in claim 14, wherein the epoxidation reaction is carried out in the presence of a titanium zeolite catalyst.

17. The method as claimed in claim 14, wherein the offgas stream comprises the olefin, methanol, water, at least one inert gas, 10 wt.-% of oxygen or less, and 100 ppm olefin oxide or less.

18. The method as claimed in claim 17, wherein, in (i), from 30 to 90 percent by weight of the olefin, from 40 to 99 percent by weight of the methanol and from 35 to 99 percent by weight of the water, comprised in the offgas stream, are condensed.

19. The method as claimed in claim 14, wherein the olefin is propene and the olefin oxide is propene oxide.

20. The method as claimed in claim 14, wherein the olefin obtained in (iii) is recirculated into said epoxidation reaction.

21. The method as claimed in claim 18, wherein the olefin, the methanol, and the water condensed in (i) are recirculated into said epoxidation reaction.

22. The method as claimed in claim 21, wherein the olefin is propene.

23. A method of separating propene from a gas stream, comprising the propene and at least one other component, said method comprising
   (i) compressing and cooling the gas stream;
   (ii) separating the propene from the gas stream by absorbing the propene in an absorbent;
   (iii) separating the propene from the absorbent by desorption;

   wherein compressing or cooling or compressing and cooling in (i) is carried out twice or three times.

24. The method as claimed in claim 23, wherein the gas stream is the offgas stream resulting from an epoxidation process, said process comprising reacting the propene with hydrogen peroxide in the presence of methanol as solvent and a titanium zeolite catalyst to give a product stream comprising propene, propene oxide, methanol, and water, and separating the propene oxide from said product stream to give the offgas stream comprising propene, methanol, and water.

25. The method as claimed in claim 24, wherein, in (i), the offgas stream is compressed to a pressure of from 13 to 18 bar and cooled to a temperature of from 30 to 45 °C and from 40 to 85 percent by weight of the propene, from 60 to 99 percent by weight of the methanol and/or from 40 to 95 percent by weight of the water, comprised in the offgas stream, are condensed.

26. The method as claimed in claim 25, wherein the olefin, the methanol, and the water condensed in (i) are recirculated into said epoxidation reaction.

27. The method as claimed in claim 23, wherein absorbing the propene in an absorbent is carried out in at least one absorption column at a pressure of from 13 to 18 bar and a temperature of from 30 to 45 °C, said absorbent having a boiling point of from 200 to 300 °C at standard pressure, and wherein separating the olefin from the absorbent is carried in at least one separation column at a pressure of from 10 to 30 bar and a temperature of from 50 to 200 °C.

28. The method as claimed in claim 27, wherein the absorbent is a mixture of hydrocarbons C_nH_{2n+2} wherein n is from 10 to 20, said mixture comprising the hydrocarbon $C_{14}H_{30}$ in an amount of 10 percent by weight of the mixture or more.

29. The method as claimed in claim 23, wherein the propene obtained in (iii) is recirculated into said epoxidation reaction.

30. The method as claimed in claim 23, wherein, after separation of propene in (iii), the absorbent is recirculated into (ii).

31. The method as claimed in claim 23, wherein, after separation of propene in (iii), the absorbent, additionally comprising propane and methanol, is separated from propane and methanol and subsequently recirculated into (ii).

32. The method as claimed in claim 31, wherein the separation of absorbent from propene and methanol is carried out in a flash drum or in a forced circulation vaporizer.

33. A method of separating an olefin from a gas stream, comprising the olefin and at least one other component, said method comprising

(i) compressing and cooling the gas stream;

(ii) separating the olefin from the gas stream by absorbing the olefin in an absorbent, said absorbent having a boiling point of from 200 to 300 °C at standard pressure and being a mixture of hydrocarbons C_nH_{2n+2} wherein n is from 10 to 20, said mixture comprising the hydrocarbon $C_{14}H_{30}$ in an amount of 30 percent by weight of the mixture or more;

(iii) separating the olefin from the absorbent by desorption;

wherein compressing or cooling or compressing and cooling in (i) is carried out twice or three times.

34. The method as claimed in claim 33, wherein the absorbent is a mixture of hydrocarbons C_nH_{2n+2} wherein n is from 13 to 15, said mixture comprising the hydrocarbon $C_{14}H_{30}$ in an amount of 50 percent by weight of the mixture or more.

35. The method as claimed in claim 33, wherein the olefin obtained in (iii) is recirculated into said epoxidation reaction.

36. The method as claimed in claim 33, wherein, after separation of the olefin in (iii), the absorbent is purified in a flash drum or in a forced circulation vaporizer and, after purification, recirculated into (ii).

37. The method as claimed in claim 33, wherein the gas stream is the offgas stream resulting from an epoxidation process, said process comprising reacting the olefin with a hydroperoxide in the presence of methanol as solvent to give a product

stream, and separating the olefin oxide from said product stream to give the offgas stream, said offgas stream comprising the olefin, methanol, water, at least one inert gas, 7 wt.-% of oxygen or less, and 100 ppm olefin oxide or less.

38. The method as claimed in claim 37, wherein, in (i), the offgas stream is compressed to a pressure of from more than 10 to 20 bar and cooled to a temperature of from 25 to 50 °C and from 40 to 85 percent by weight of the olefin, from 60 to 99 percent by weight of the methanol and from 40 to 95 percent by weight of the water, comprised in the offgas stream, are condensed.

39. The method as claimed in claim 38, wherein the olefin, the methanol, and the water condensed in (i) are recirculated into said epoxidation reaction.

40. The method as claimed in claim 33, wherein absorbing the olefin in the absorbent is carried out in at least one absorption column at a pressure of from more than 10 to 20 bar, and wherein separating the olefin from the absorbent is carried in at least one separation column at a pressure of from 12 to 28 bar and a temperature of from 50 to 200 °C.

41. The method as claimed in claim 35, wherein the olefin obtained in (iii) is obtained by separation from absorbent in a separation column.

42. The method as claimed in claim 33, wherein the olefin is propene and the hydroperoxide is hydrogen peroxide.

43. A method of separating propene from a gas stream, said gas stream being an offgas stream of an epoxidation process, said epoxidation process comprising reacting propene with hydrogen peroxide in the presence of a titanium zeolite catalyst and methanol as solvent to give a product stream, said epoxidation process further comprising separating propene oxide from said product stream to give said offgas stream, said offgas stream comprising propene, methanol, and water, said method comprising

(i) compressing the offgas stream at a pressure of from 13 to 18 bar and cooling the compressed offgas stream at a temperature of from 30 to 45 °C and repeating compressing and cooling once or twice, wherein from 50 to 80 percent by weight of the propene, from 60 to 99 percent by weight of the methanol and/or from 45 to 90 percent by weight of the water, comprised in the offgas stream, are condensed and recirculated into said epoxidation reaction;

(ii) separating the propene from the compressed and cooled offgas stream by absorbing the propene at a pressure of from 13 to 18 bar in an absorbent,

said absorbent having a boiling point of from 200 to 300 °C at standard pressure and being a mixture of hydrocarbons C_nH_{2n+2} wherein n is from 13 to 15, said mixture comprising the hydrocarbon $C_{14}H_{30}$ in an amount of 30 percent by weight of the mixture or more;

(iii) separating the propene from the absorbent by desorption in a separation column at a pressure of from 12 to 28 bar and a temperature of from 50 to 200 °C, and recirculating the absorbent into (ii);

(iv) recirculating the propene stream obtained in (iii) into said epoxidation reaction.

44. An integrated process for producing propene oxide, said process comprising reacting propene with hydrogen peroxide in the presence of a titanium zeolite catalyst and methanol as solvent to give a product stream, said product stream comprising propene, propene oxide, methanol, and water, said process further comprising separating propene oxide from said product stream to give the offgas stream, comprising propene, methanol, at least one inert gas, 7 wt.-% oxygen or less, and water, said integrated method further comprising

(i) compressing the offgas stream at a pressure of from 13 to 18 bar and cooling the compressed offgas stream at a temperature of from 30 to 45 °C and repeating compressing and cooling once or twice, wherein from 50 to 80 percent by weight of the propene, from 60 to 99 percent by weight of the methanol and/or from 45 to 90 percent by weight of the water, comprised in the offgas stream, are condensed and recirculated into said epoxidation reaction;

(ii) separating the propene from the compressed and cooled offgas stream by absorbing the propene at a pressure of from 13 to 18 bar in an absorbent, said absorbent having a boiling point of from 200 to 300 °C at standard pressure and being a mixture of hydrocarbons C_nH_{2n+2} wherein n is from 13 to 15, said mixture comprising the hydrocarbon $C_{14}H_{30}$ in an amount of 30 percent by weight of the mixture oer more;

(iii) separating the propene from the absorbent in a separation column at a pressure of from 16 to 25 bar and a temperature of from 50 to 200 °C, recirculating the propene obtained in (iii) into said epoxidation reaction, purifying the absorbent obtained in a forced circulation vaporizer at a pressure of from 0.5 to 4 bar and recirculating the purified absorbent into (ii).

45. An integrated process for producing propene oxide, said process comprising reacting propene with hydrogen peroxide in the presence of a titanium zeolite catalyst and methanol as solvent to give a product stream, said product stream comprising propene, propene oxide, methanol, and water, said process further

comprising separating propene oxide from said product stream to give the offgas stream, comprising propene, methanol, at least one inert gas, 7 wt.-% oxygen or less, and water, said integrated method further comprising

(i) compressing the offgas stream at a pressure of from 13 to 18 bar and cooling the compressed offgas stream at a temperature of from 30 to 45 °C and repeating compressing and cooling once or twice, wherein from 50 to 80 percent by weight of the propene, from 60 to 99 percent by weight of the methanol and/or from 45 to 90 percent by weight of the water, comprised in the offgas stream, are condensed and recirculated into said epoxidation reaction;

(ii) separating the propene from the compressed and cooled offgas stream by absorbing the propene at a pressure of from 13 to 18 bar in an absorbent, said absorbent having a boiling point of from 200 to 300 °C at standard pressure and being a mixture of hydrocarbons C_nH_{2n+2} wherein n is from 13 to 15, said mixture comprising the hydrocarbon $C_{14}H_{30}$ in an amount of 30 percent by weight of the mixture or more;

(iii) separating the propene from the absorbent in a separation column at a pressure of from 16 to 25 bar and a temperature of from 50 to 200 °C, recirculating the propene obtained in (iii) into said epoxidation reaction, purifying the absorbent obtained in a forced circulation vaporizer at a pressure of from 0.5 to 4 bar and recirculating the purified absorbent into (ii);

(iv) recirculating the propene stream obtained in (iii) into said epoxidation reaction;

(v) partially recirculating the bottoms stream obtained from an absorption column used in (ii), into said absorption column.